equal thickness of the most exquisite blue; on the dry bed of the lake were stranded the bergs which the day before had floated in its waters, and we could now appreciate their true size. One whose shape we had greatly admired now appeared even more beautiful with its fantastic pinnacles and blue recesses. It was, I estimated, from 30 to 40 feet high, nearly as wide, and considerably longer. Two cubical masses on the opposite shore were in colour the most lovely turquoise blue that I have ever seen. These, no doubt, on the previous day had appeared as mere slabs on the surface. The bed of the lake was covered with a fine mud, on which were numerous tracks or castings, which I attributed to a worm. I did not see any shells, so that probably no mollusks live in the chilly waters of the Märjalen See.[1]

The ice in this part of the Aletsch glacier is comparatively little crevassed. This permits the glacier to act as a dam; the drainage of the lake is no doubt due to some accidental rupture which opens a communication, quickly enlarged by the running water, with the sub-glacial drainage of the glacier.

A traveller in August 1872 was so fortunate as to see the actual escape of the water at the lower part of the glacier. He describes it as follows[2]:—"It was 4.50 p.m. when we arrived (at the Bel Alp Hotel). The domestics drew our attention to a sound like the roar of a cataract, which seemed to descend the Aletsch. For a time the sound was sub-glacial, but a yellow torrent at length appeared on the opposite side of the glacier, smoking and roaring as it tumbled down the declivities of ice. The front of the torrent soon appeared opposite to the Bel Alp, carrying every movable thing along with it. Wishing to get near the torrent, I descended rapidly to the glacier, crossed it, and succeeded in getting quite close to the rushing water. Everywhere impetuous, it was divided into spaces of tolerably uniform slope, separated from each other by steep and broken declivities, down which the water plunged with tremendous fury. At the base of one of these falls it was met by a kind of reflecting surface, by which the rhythmic character of the motion was finely revealed. The water here was tossed upwards in a series of vast parallel fans, carrying with them ice-blocks and stones, and breaking above into a spray as fine as smoke. A bend of the glacier came in for the lateral portion of this spray, and over it the rounded blocks of ice and the stones were showered like projectiles. The sound of the torrent had not abated at bed-time, but this morning all is quiet, and no water is to be seen in the temporary channel."

This sudden discharge of so great a body of water, in addition to damaging the fields immediately below, very considerably raises the level of the Rhone. On the last occasion, September 4, the writer quoted at the beginning of this article states that "the level of the Rhone rose at Brieg 5½ feet, from about 3½ feet to 9 feet, and at Sitten 4 feet, from 6½ feet to 10½ feet. The greatest rise observed since the regulation of the Rhone from the same cause took place on July 19, 1878, and although it was then at Brieg only 5 feet, and at Sitten only 3 feet, it was considered a very fortunate circumstance that the event took place at a very low level of the Rhone for the season."[3] He adds that to avoid such a danger in future it is proposed to enlarge greatly a channel which many years since was cut through the moraine stuff overlying the rock east of the lake, and so provide an outlet towards the Viesch glacier. By this "the volume of its waters will be reduced to about half what it is at present (10,000,000 cubic metres)." So that future travellers will not see the Märjalen See in its full beauty. The lake formed by the advance of the Gétroz glacier, in the upper part of the Dranse valley, the bursting of which in 1818 wrought such fearful devastation, may be regarded as to some extent a parallel case with the Märjalen See, of a more temporary nature, but on a grander scale.

In Sir Charles Lyell's "Principles of Geology" (chapter xvi.), and again in his "Antiquity of Man" (chapter xiv.), are notices of the Märjalen See, and of some beach terraces formed by its waters. He regards it as illustrative of the celebrated parallel roads of Glenroy, but, though this explanation has found very general favour with geologists, I must confess myself unable to accept it. But into this thistle-bed of controversy I must not permit myself to wander. T. G. BONNEY.

THE BACILLUS OF MALARIA.

A PAPER of unusual interest in relation to the question of the agency of microphytes in the production of disease will shortly appear in Prof. Cohn's botanical *Beiträge* (vol. v. part 2). For many years the efforts of pathologists have been directed in this relation to the subject of malaria. The local conditions which determine the "endemic" prevalence of ague have been studied with considerable exactitude. They are such as to indicate very clearly that the material cause of intermittent fever, although it is generated in the soil, acts through the air. The fact that its influence is restricted within very narrow limits of distance from its source indicates that it is not diffusible like a gas or vapour, but consists of particles which, on various grounds, are surmised to be living organisms of extreme minuteness. Can this be established on evidence which will bear criticism?

All will remember that in 1879 Tommasi Crudeli published (in conjunction with Prof. Klebs) observations which tended to show that in malarious districts a Bacillus inhabits the soil which can be cultivated so as to yield a product capable, when inoculated, of producing in animals a fever of intermittent type, accompanied by the anatomical characteristics of malarious infection. Subsequently it was found by several observers that, during the cold stage of ague, spore-containing Bacilli, conjectured to be identical with those of Crudeli, are to be found in the blood.

These results have been received by pathologists with much misgiving, partly because the experimental proofs appeared inadequate, partly because other observers failed in their endeavours to verify them. Dr. Schiavuzzi, a medical practitioner at Pola, on the Adriatic, appears to have been more fortunate. Following the methods of Dr. Koch, he has sought for organisms in the air of the malarious district near the town in which he resides, and with such success that he is able, in repeated observations, to obtain without fail pure cultivations of a Bacillus which is not only indistinguishable as regards its structure from that of Crudeli, but also produces in animals the characteristic symptoms and pathological changes which belong to ague. The first communication of Dr. Schiavuzzi's results was made to the Accademia dei Lincei more than a year ago (see *Rendiconti*, vol. ii. 1886, April 4), but excited very little attention. It so happened that in the course of the past summer Prof. Cohn visited Pola, and so became acquainted with Dr. Schiavuzzi, who, during the present year, has been pursuing his investigations. In consequence, Prof. Cohn has been able to repeat the Pola experiments in his own laboratory at Breslau, and, so far as possible, to confirm the discovery. The writer had the opportunity, a short while ago, when Prof. Cohn was in England, of reading the proofs of Schiavuzzi's paper, and of seeing the very perfect photographs of the Bacillus which have been made of it at Breslau.

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[1] Ramsay found the temperature of the water near the ice-cliff to be 3° C.

[2] J. T. quoted from the *Times* in *Alpine Journal*, vol. vi. p. 100.

[3] An account of this is given by F. V. Salis (*Jahrb. Schweiz. Alpencl.* 1878-79, p. 549. The discharge on this occasion was at first slow. It began at 8 a.m. July 18; by 4 p.m. the lake had sunk 1 metre; during the darkness it sank 4 metres, and by 3 p.m. most of the contents were gone. It was estimated that only 700,000 cubic metres of water out of 10,000,000 remained.

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Although it may be admitted that evidence of a more conclusive kind than any which has been offered by Dr. Schiavuzzi is required to establish the truth of his inference, yet there seems to be good reason for thinking that he has approached much nearer to a solution of the question than any of his predecessors. J. B. S.

NOTES.

AT the meeting of the Academy of Sciences, Paris, on the 17th inst., Admiral Mouchez spoke of the preparations which are being made for executing the photographic charts of the heavens. Ten of the photographic telescopes, seven by MM. Henry and Gautier, of Paris, and three by Sir H. Grubb, of Dublin, are expected to be finished by the end of 1888 and forwarded to various observatories in France, Spain, South America, and Australia. With the promised co-operation of England, the United States, and Russia, it is hoped that a good beginning will be made in 1889, and that the vast undertaking will be completed within the time anticipated by the International Congress of last April.

PROFS. CAYLEY, F.R.S., AND M. J. M. HILL retire from the Council of the London Mathematical Society. The new names selected by the Council for submission to the Society at its annual meeting (November 10), are those of Mr. A. Buchheim and Dr. J. Larmor. The De Morgan Medal, which we have already announced as awarded to Prof. Sylvester, F.R.S., will be presented to him at the aforesaid meeting.

ON December 8 next, Herr Friedrich Traugott Kützing will be eighty years of age, and a good many men of science in Germany are anxious to give emphatic expression on the occasion to their respect for his character and their appreciation of his labours. Herr Kützing was one of the first to recognize that the best material for the study of cells and their life is provided by the simplest plants; and the results of his researches are well known to all biologists. It is proposed that a gift of some kind shall be presented to him on his eightieth birthday, and an influential Committee has been appointed to make the necessary arrangements. If any English students of biology would like to associate themselves with their German colleagues in this matter, they should communicate with the secretary of the Committee, Herr Otto Müller, 44 Köthenerstrasse, Berlin, W.

M. NOLAN, student at the Geological Laboratory of the Sorbonne, has been intrusted by the French Ministry of Public Instruction with a mission to study the geology of the Balearic Islands.

A NOTIFICATION in the *Calcutta Gazette* states that the Maharanee of Cossimbazar has given twenty thousand rupees for the promotion of technical education in the Moorshedabad district. The donor of this munificent sum proposes that five thousand rupees shall be spent in purchasing the necessary apparatus and instruments. The interest on the remainder is to be devoted to endowing a class in the Berhampore Collegiate School, and establishing classes in connexion with the college class in some of the neighbouring elementary schools. The Lieutenant-Governor of Bengal accepts the gift, and approves of the scheme proposed by the Maharanee.

AN interesting address on English and foreign technical education was delivered last Saturday by Prof. Silvanus Thompson, at the Aldingham Institute, a school of technical education in Goldington Crescent, St. Pancras. In the course of his address Prof. Thompson drew attention to the fact that in Berlin there is a great State-aided institution in which every known industry is taught. This institution he described as a large building—as big as Buckingham Palace, if not quite so beautiful—standing on a site of about 12 acres. It had something like 500 rooms for technical teaching, and, in fact, was a perfect college, with a good library. He believed that the entire cost of that establishment had been about £960,000. It was a building which had cost about the same amount as one of our ironclads. The entire maintenance of the institution was about £38,000 per annum; but that expenditure and the original outlay were recouped by the well-to-do character of those who had passed through its teaching, and thus had become useful members of society instead of drags upon the country. For such a country as England a site not of 12 acres but of 40 acres would be required. It might cost £4,000,000 to build and £100,000 a year to maintain, and from the results which would follow it would be cheap at the price, for it would enable us to obtain every possible requirement of life from our own handicraftsmen, instead of having to go to foreign countries for what we need. It would do more, for the superiority of English workmanship would cause fresh demands to be made from us, not only throughout our own colonies, but from foreign countries also.

THE Geodynamical Committee of the Italian Meteorological Society held meetings at Aquila from September 6 to 8. A preliminary meeting had been held at Florence in May last to prepare the work of the present one. The object was to formulate practical and uniform directions for the seismological researches undertaken by the Society, and to deduce from our actual knowledge rules to be followed in the construction of houses, so as to diminish the risk of damage in earthquakes and undulatory motions. M. Bertelli, of Florence, explained the theory of his new bifilar instrument for determining the least tremors of the earth, and he was invited to prepare directions for its construction, erection, and use, to be added to the report of the discussion. He also described his apparatus for the protection of telephones from lightning. The choice of a type of seismograph was the subject of a long discussion, and a Committee was nominated for the study of this very important question. The consideration of the best mode of collecting, discussing, and publishing the seismic and micro-seismic observations now being made in Italy was referred to the same Committee. On the consideration of the rules to be followed in the construction of buildings, M. de Rossi, of Rome, indicated the further observations which ought to be made. MM. Denza, De Giorgi, Roberto, Bertelli, and Galli also took part in the discussion. The resolutions adopted will be printed, and distributed to the various municipalities for the instruction of the persons concerned. This meeting of students of seismology is the first that has been held in Italy. The Secretary of this enterprising Society is Dr. O. L. Bianco.

THE other day the Committee of the Chester Society of Natural Science passed a resolution, which was entered in their minutes, expressing their deep sense of the loss the Society had sustained through the death of Mr. John Price, which took place on Friday, the 14th inst. He had reached the ripe age of eighty-four. Upwards of forty years ago, when residing at Birkenhead, Mr. Price occupied himself with the fauna of the Birkenhead shore, and the value of his researches was recognized by various scientific investigators of acknowledged eminence. The last of his observations on the shore were embodied in a paper on the pluteus of the starfish, read before Section D of the British Association meeting at Liverpool in 1852. To the Proceedings of Section D of the British Association he contributed papers from time to time at subsequent meetings. Having settled at Chester in 1858, Mr. Price was soon the means of establishing in the city a Society for the study of natural history. Ten years later, after the appointment of the late Charles Kingsley to a canonry in the Chester Cathedral, this Association was merged in the present Society, founded by Mr. Kingsley, who was one of Mr. Price's intimate friends. Mr. Price accepted,

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